OIPE IAP19
MAY 12 2006
PATENT & TRADEMARK OFFICE

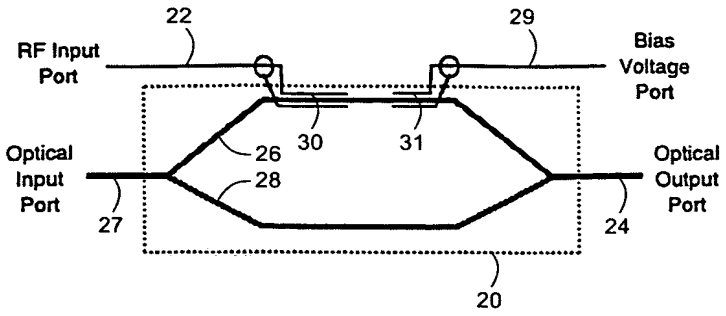


Figure 1

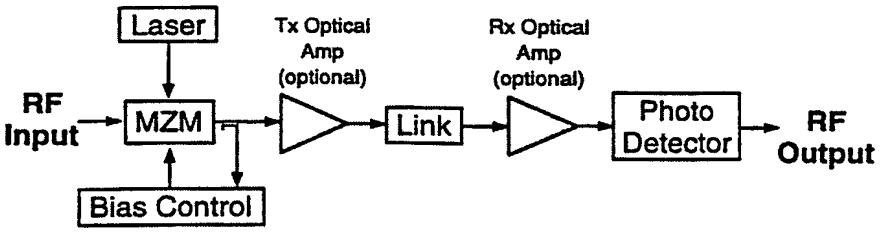


Figure 2

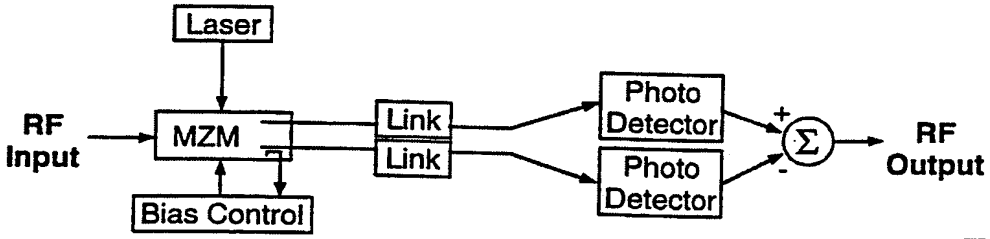


Figure 3

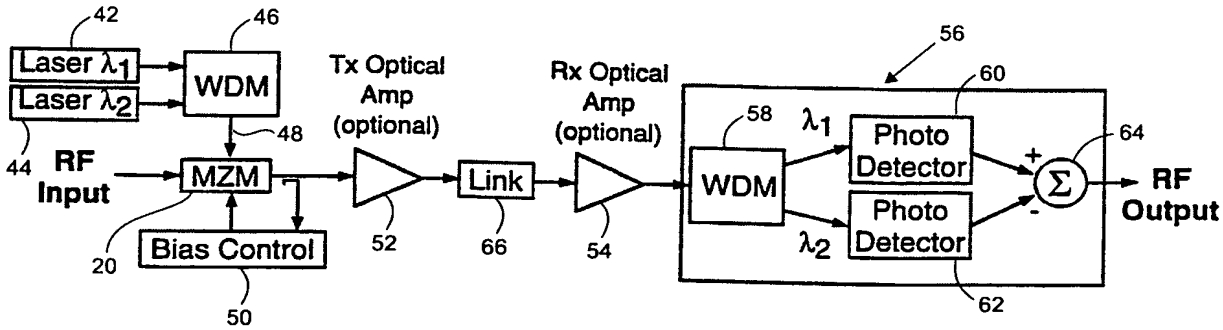


Figure 4

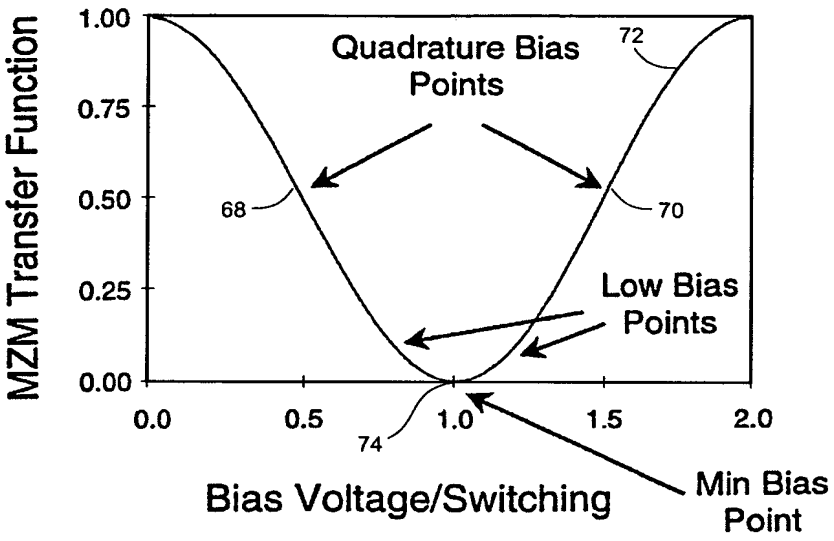

MZM Transfer Function
1.00
0.75
0.50
0.25
0.00
0.0
0.5
1.0
1.5
2.0
Quadrature Bias Points
72
68
70
Low Bias Points
74
Min Bias Point
Bias Voltage/Switching

Figure 5

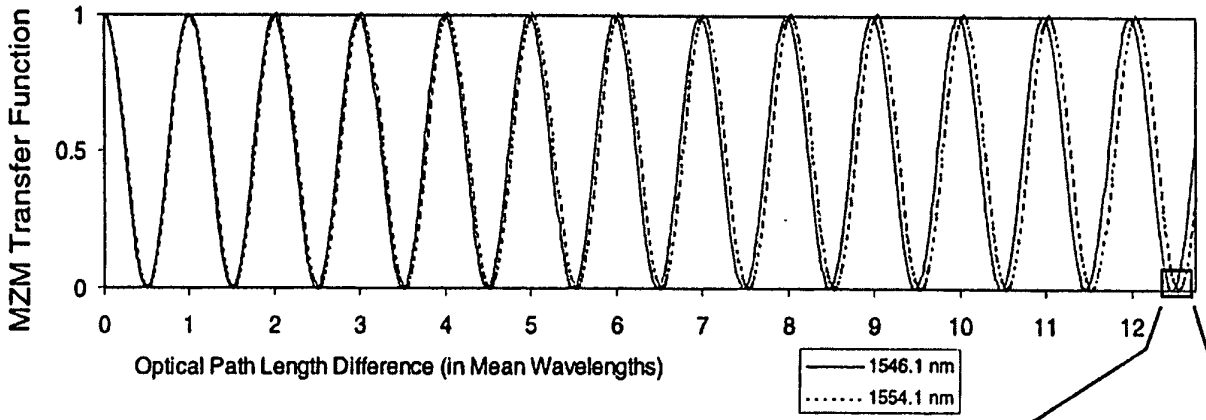


Figure 6A

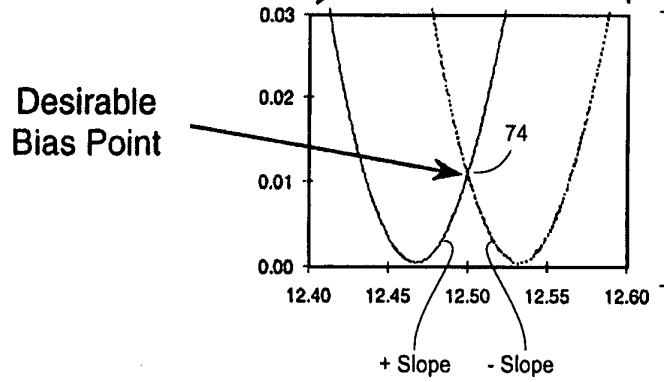


Figure 6B

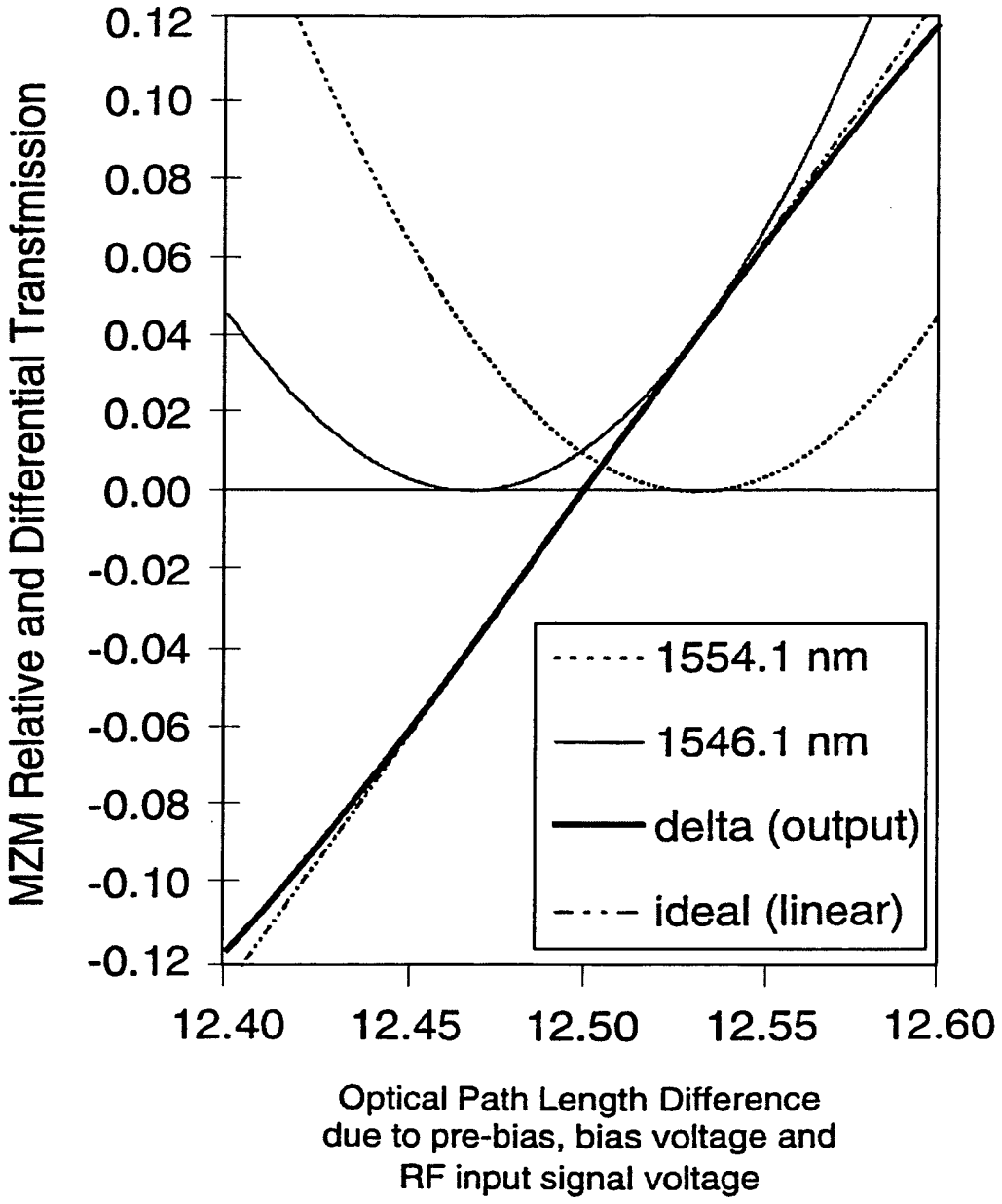

MZM Relative and Differential Transfmission
0.12
0.10
0.08
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
-0.08
-0.10
-0.12
12.40
12.45
12.50
12.55
12.60
1554.1 nm
1546.1 nm
delta (output)
ideal (linear)
Optical Path Length Difference
due to pre-bias, bias voltage and
RF input signal voltage

Figure 7

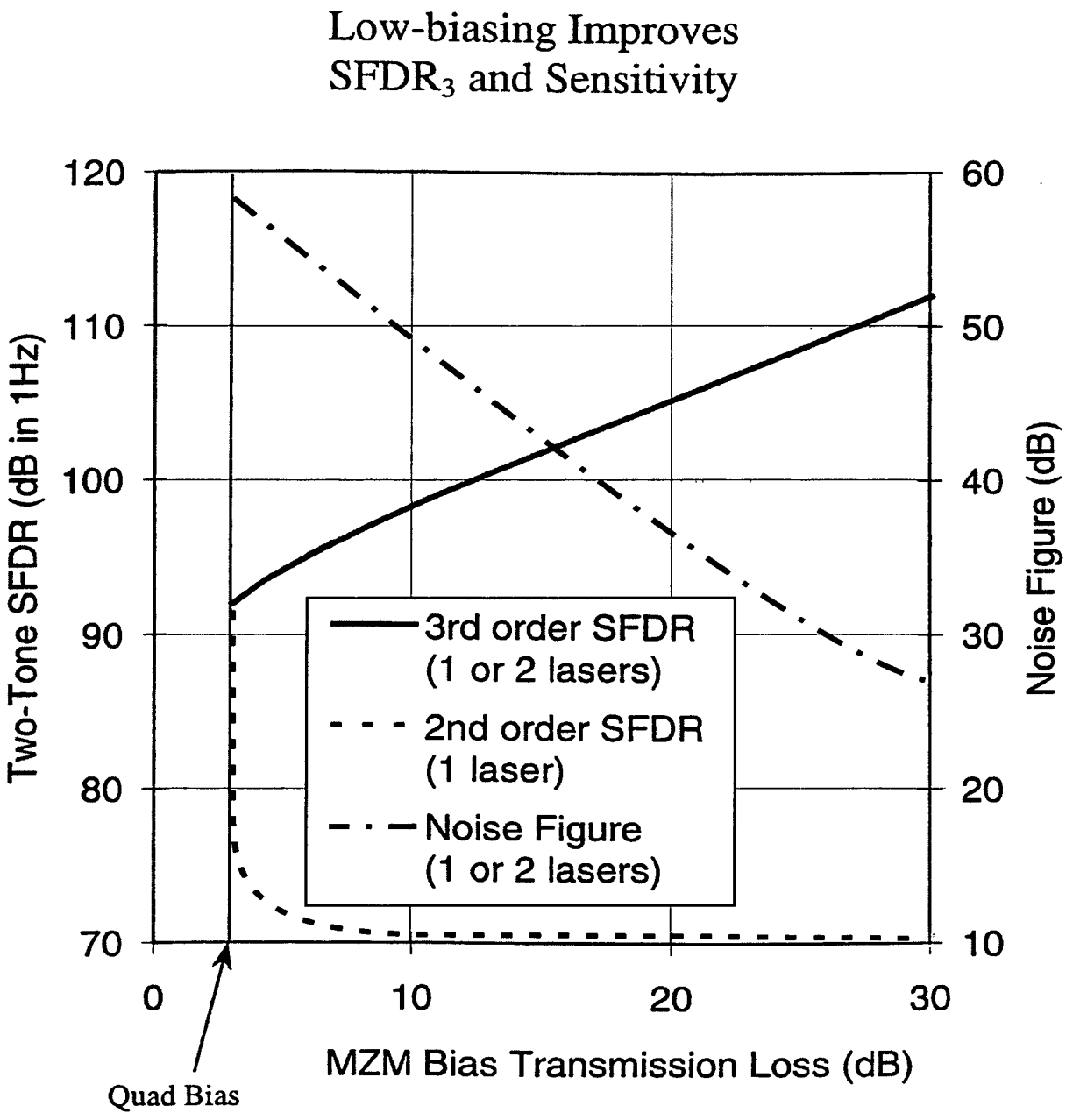
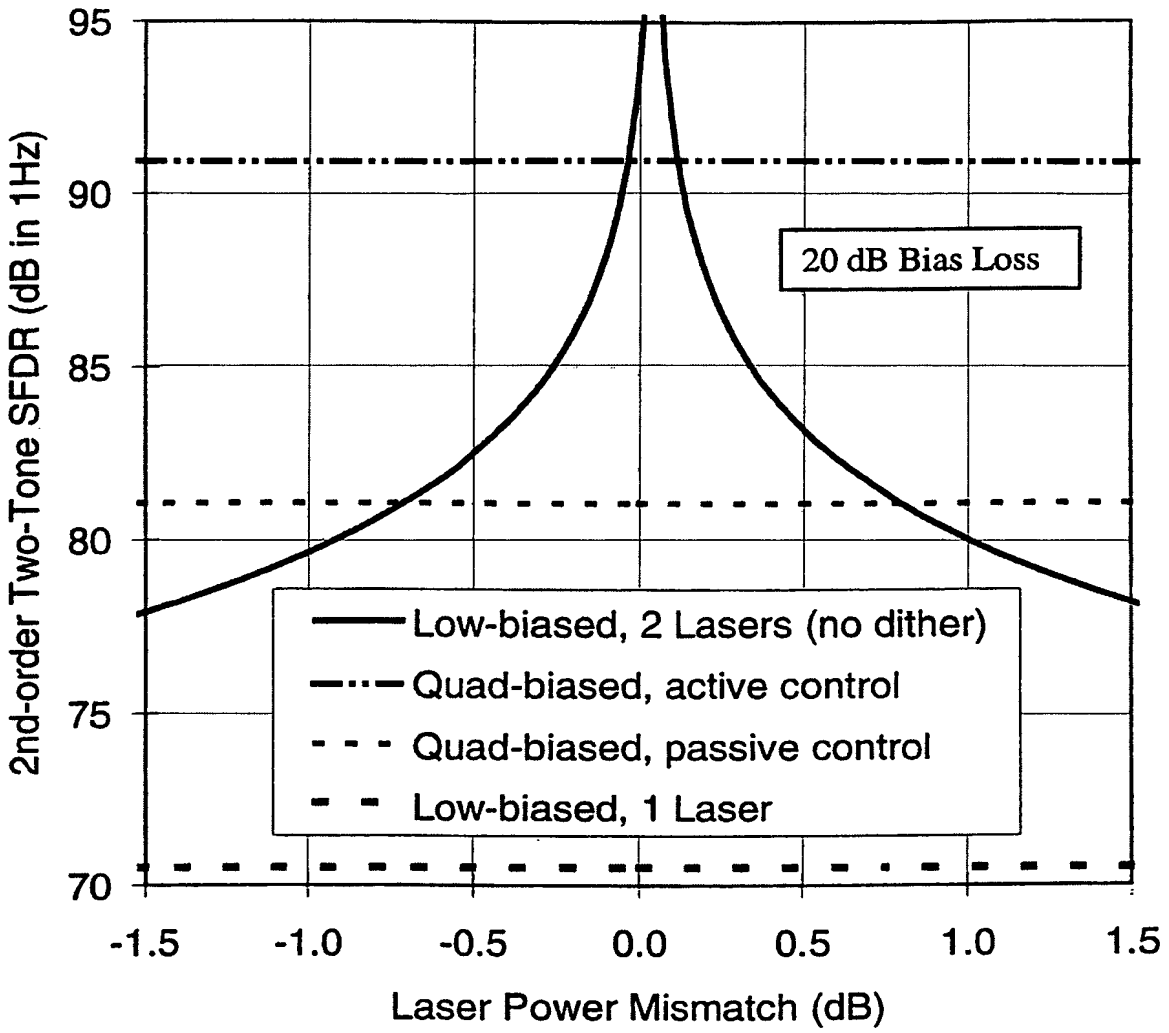

Low-biasing Improves
SFDR3 and Sensitivity
120
110
100
90
80
70
60
50
40
30
20
10
0
10
20
30
Two-Tone SFDR (dB in 1Hz)
Noise Figure (dB)
MZM Bias Transmission Loss (dB)
3rd order SFDR
(1 or 2 lasers)
2nd order SFDR
(1 laser)
Noise Figure
(1 or 2 lasers)
Quad Bias

Figure 8

Two Wavelength Approach Improves Low-biased $SFDR_2$



(Laser Outputs to Bias Control Detector Outputs)

Figure 9